

„Minimum Performance Standard for the qualification of Child Restraint Systems for the use in aircraft, inclusive operational aspects“

Atlantic City, October, 2001

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Contents of the presentation

- Basis of the presented results
- Objectives of the research projects
- Results of the research projects
- Minimum Performance Standard (MPS)



Could this be the solution for safe transport of children in aircraft ?

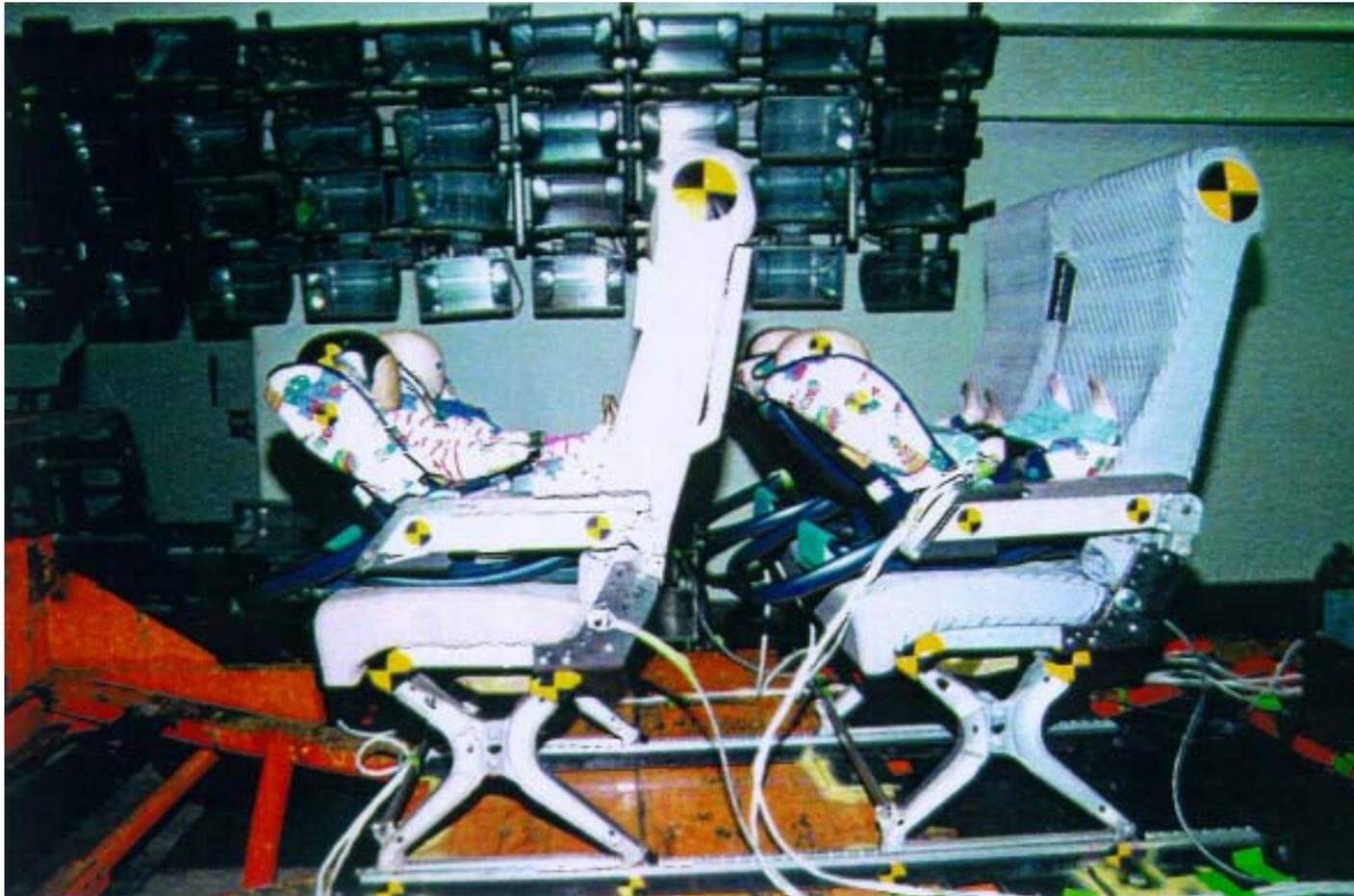
Two research projects

- Conducted in the time 1995 - 2001
- Commissioned by the German Federal Ministry of Transport
- Realised by TÜV Rheinland / Aviation Technology

The projects were focused on:

- Useful classification of children
- Aircraft passenger survey
- Evaluation of child restraint systems (CRS) for automobiles with regard to their applicability in aircraft
- Installation and adaptation tests
- Development of a test configuration and implementation of dynamic tests with CRS
- Equivalent safety for all passengers
- Development of requirements for the safe transport of infants and children in aircraft

Child Restraint Systems for children up to 9 kg



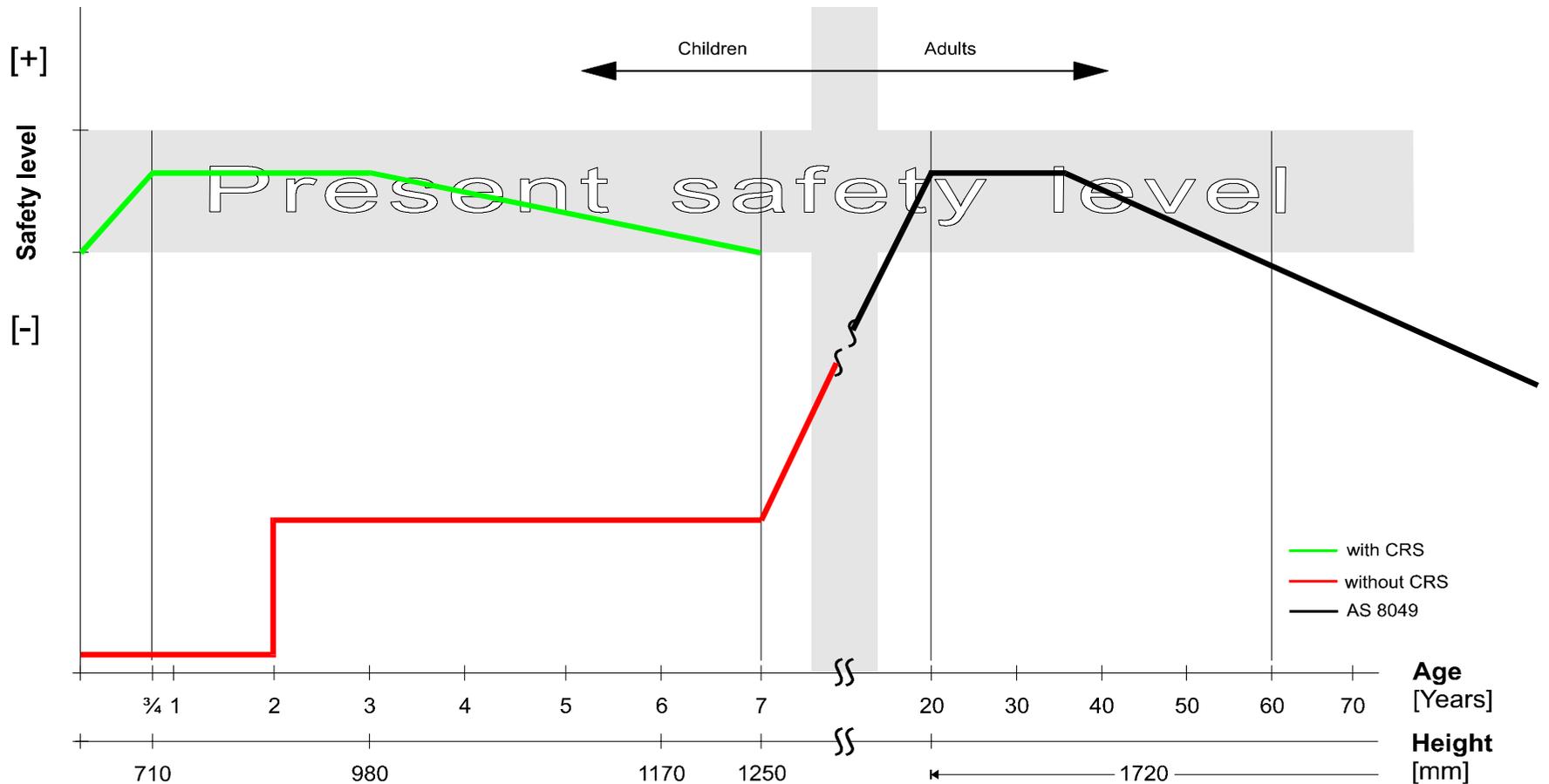
Child Restraint Systems for children from 9 to 36 kg



Equivalent safety for occupants

- Each occupant must have an own survival area !
- Each occupant must have an own passenger seat !
- The same level of passive safety of all occupants !
- Children up to 6 years or 1,25 metre heights must use a suitable CRS !

Safety level for the 50% passenger



- Passive safety for infants and children, adequate to adult's passive safety, can only be achieved with an own seat and a suitable restraint system
- Depending on the age (weight) it must be differentiated between forward and backward-facing restraint systems
- Future requirements for the use of CRS in aircraft must take into consideration:
 - Restraint principle for children
 - Biomechanics
 - CRD fixing possibilities on passenger seats
 - Operational aspects

Minimum Performance Standard (MPS) for the qualification of CRS for the use in aircraft was developed on:

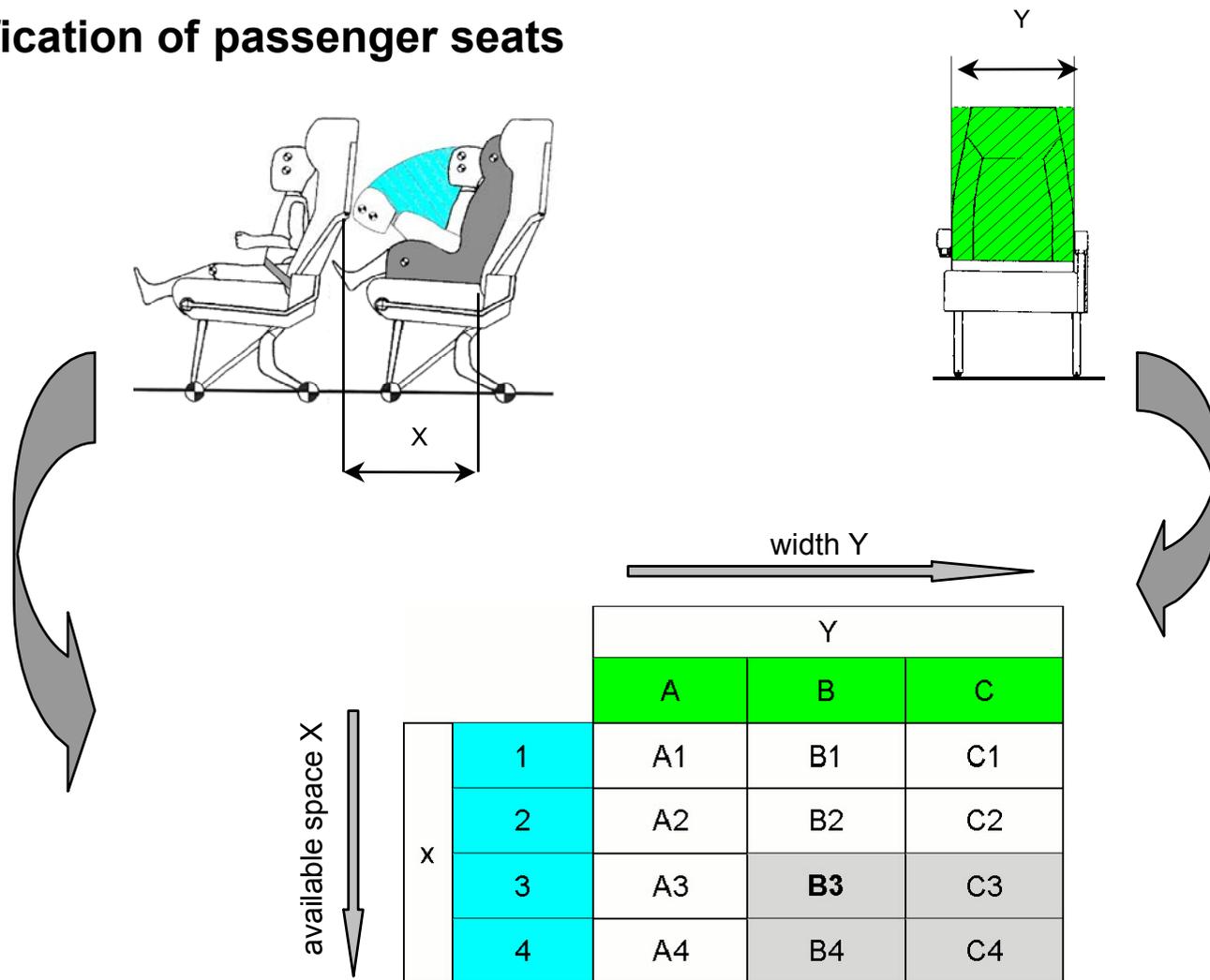
- the basis of research + development results,
- discussion with airlines, manufacturer of CRS,
national authorities; JAA, Austro Control, FAA, NTSB,
NHTSA and others

Contents of MPS

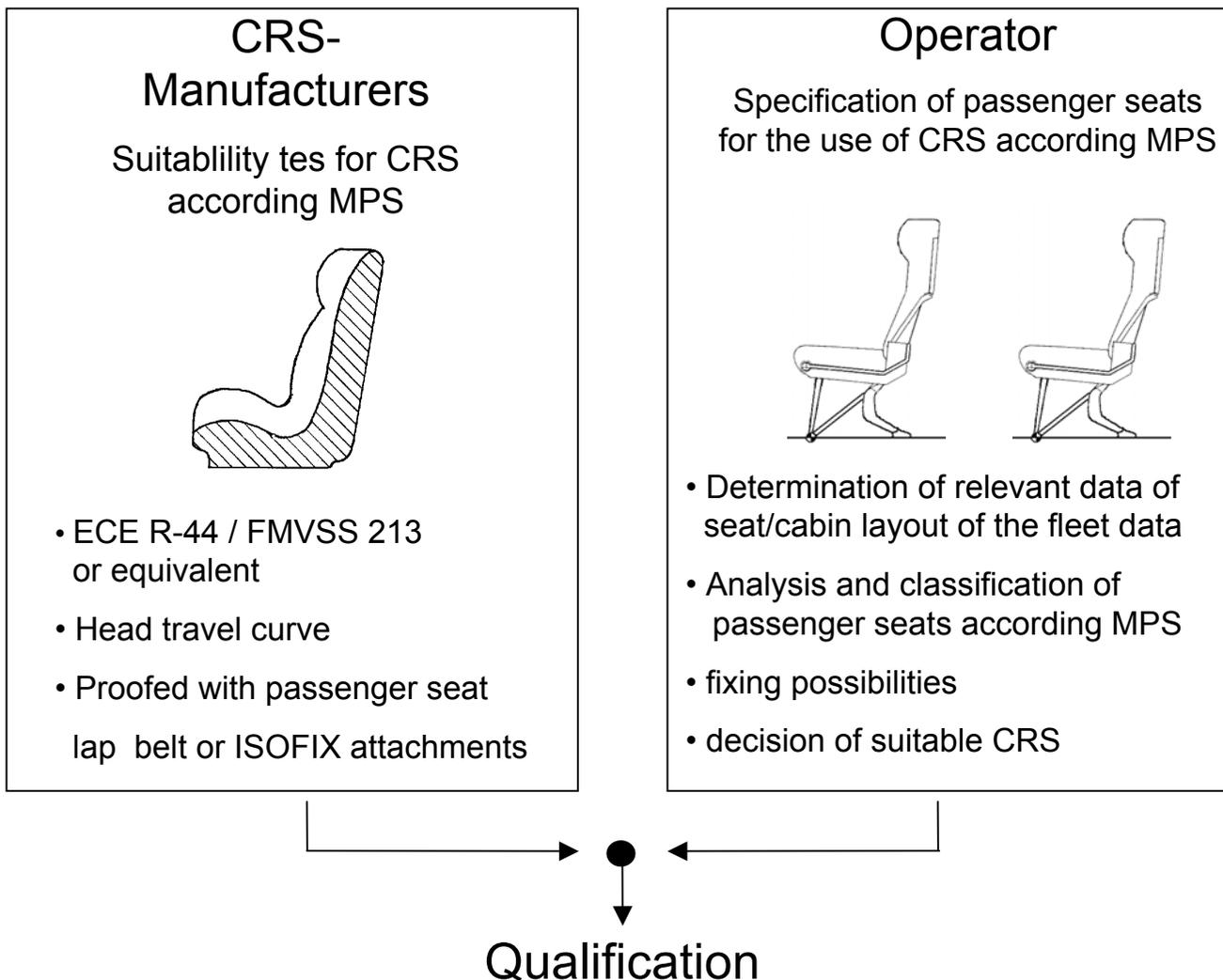
- Suitability procedure of CRS for the use on passenger seats
- Specification procedure for passenger seats for the use of CRS
- Qualification of CRS for the use on representative passenger seats
- Operational aspects

Minimum Performance Standard

Classification of passenger seats



Minimum Performance Standard



Qualification

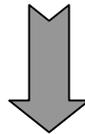
- Check whether suitability test for the CRS is complete
- Check whether specification of passenger seat is complete
- Comparison of the head travel curve with the available space of the representative passenger seat
- Check whether the fixing attachments are compatible with passenger seat/CRS

Minimum Performance Standard

Qualification Report

Qualification ID-Number

XYZ 123

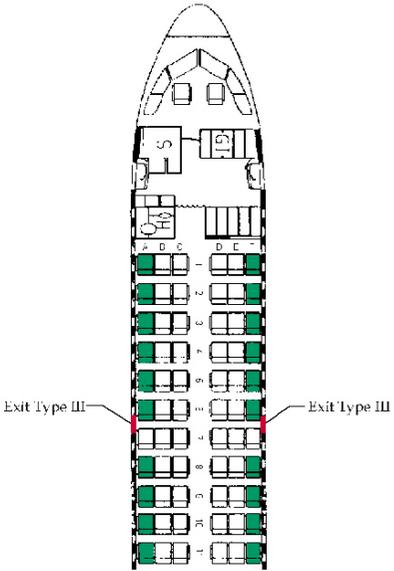


Database :



Minimum Performance Standard

Operation aspects

Operator			
Flight Safety Manual / Operations Manual			
Cabin Layout			
 <p>Exit Type III</p> <p>Exit Type III</p> <p>■ use of CRS</p>	Child restraint systems		
	group	height [cm]	age
	0	? 45 - 75	up to approx. 9 month
	0+	? 45 - 80	up to approx. 12 month
	I	? 65 - 120	8 month – 5 years
II	? 55 - 130	approx. 3 – 7 years	
<p>note: groups 0 and 0+ only backward-facing! from 6 years or 125 cm body height no child restraint system!</p>			
Applicable CRS			
ID - Number	group		
.....		
.....		
:	:		
:	:		

Conclusion

- This MPS takes into consideration the technical aspects of the CRS, passenger seats/cabin layouts and operational aspects.
- A CRS can only be qualified together with representative passenger seats under consideration of the specific fixing possibilities of this seat.
- The qualification procedure makes sure that the qualified CRS fits nearly 100 % of the passenger seats concerned.
- Decision whether CRS fits or not has been done before boarding